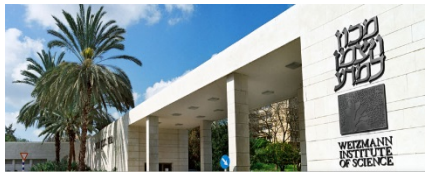
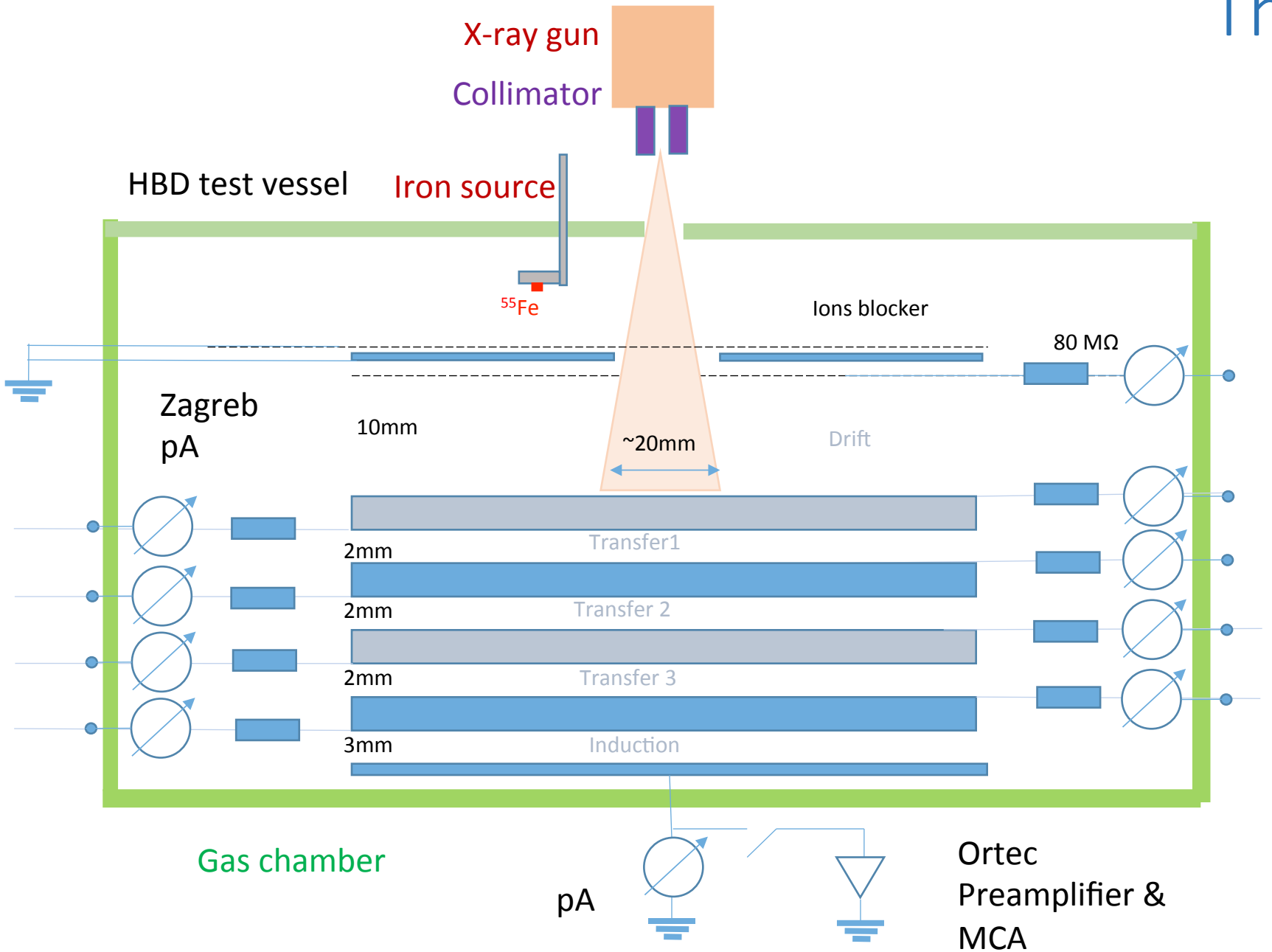
מכון ויצמן למדע
WEIZMANN INSTITUTE OF SCIENCE

First results at WIS

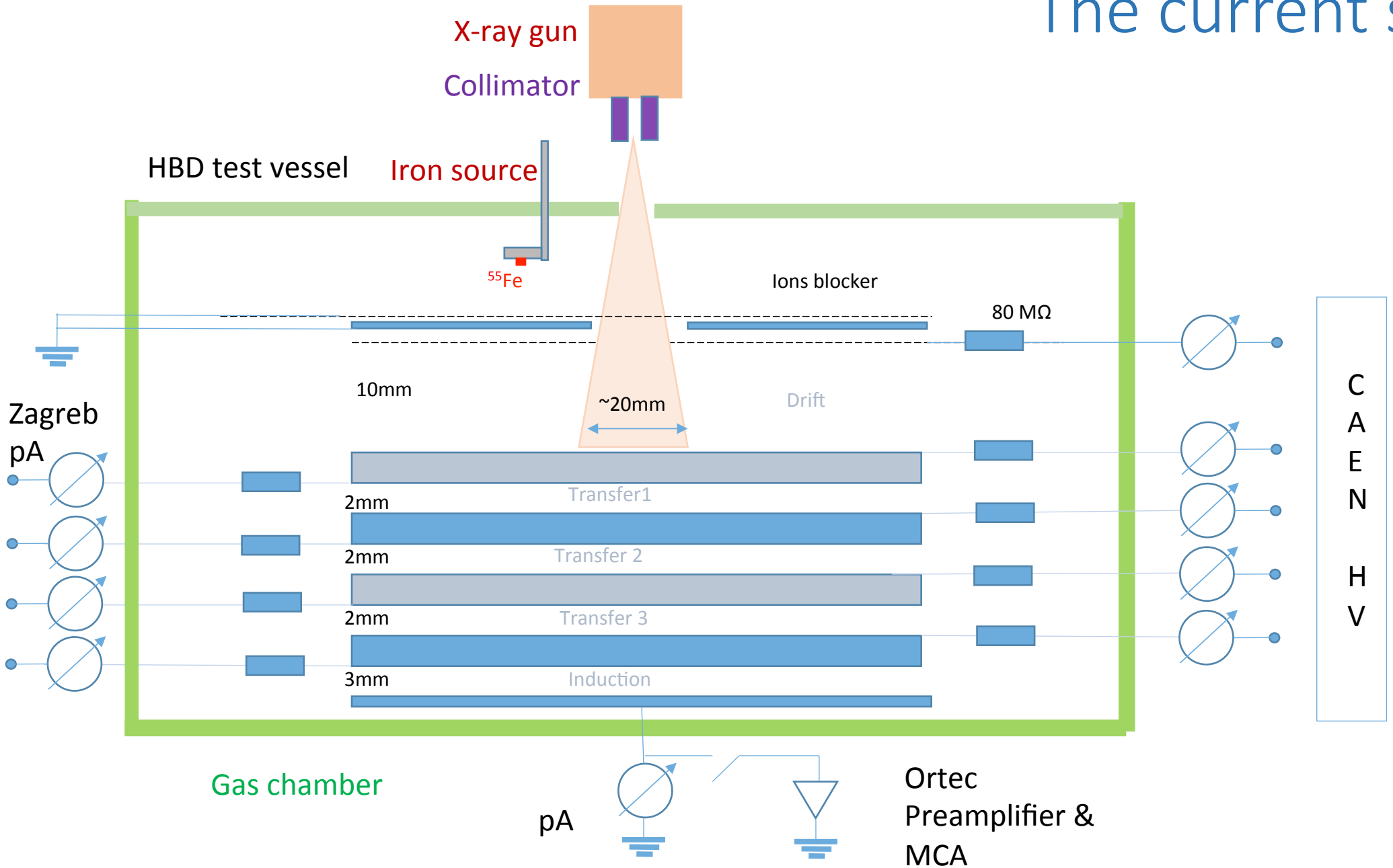
18.08.16



The first setup



The current setup



Gas system

Gas system was recalibrate “by hands”.

We can claim 5-10% relative fraction accuracy

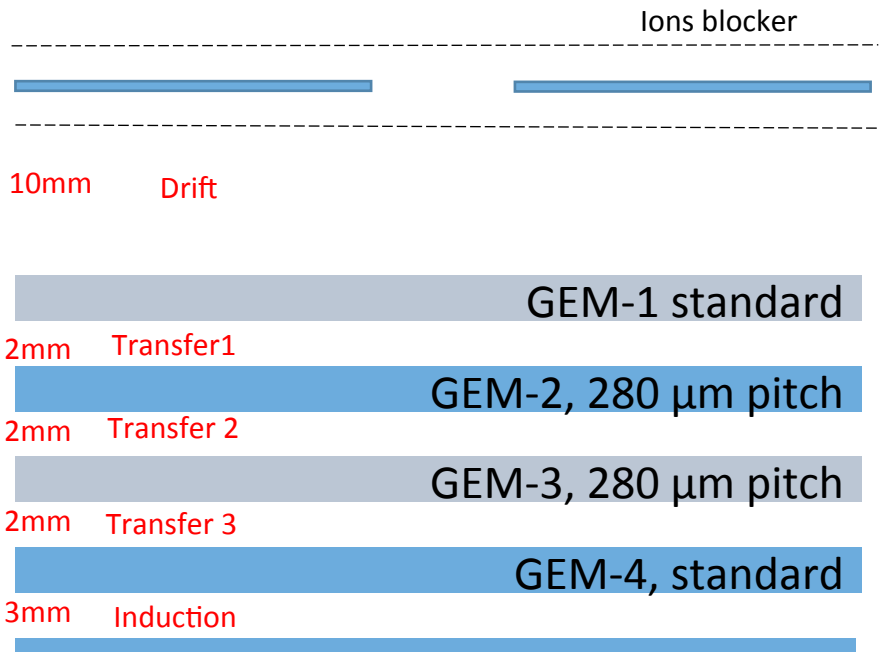
Unfortunately, two Aalborg flow controllers “went sick” and need replacement.

Started with:	80/20	Ar CO_2
Switched to:	90/10/5	Ne CO_2 N_2

Now running at 50 cc/min

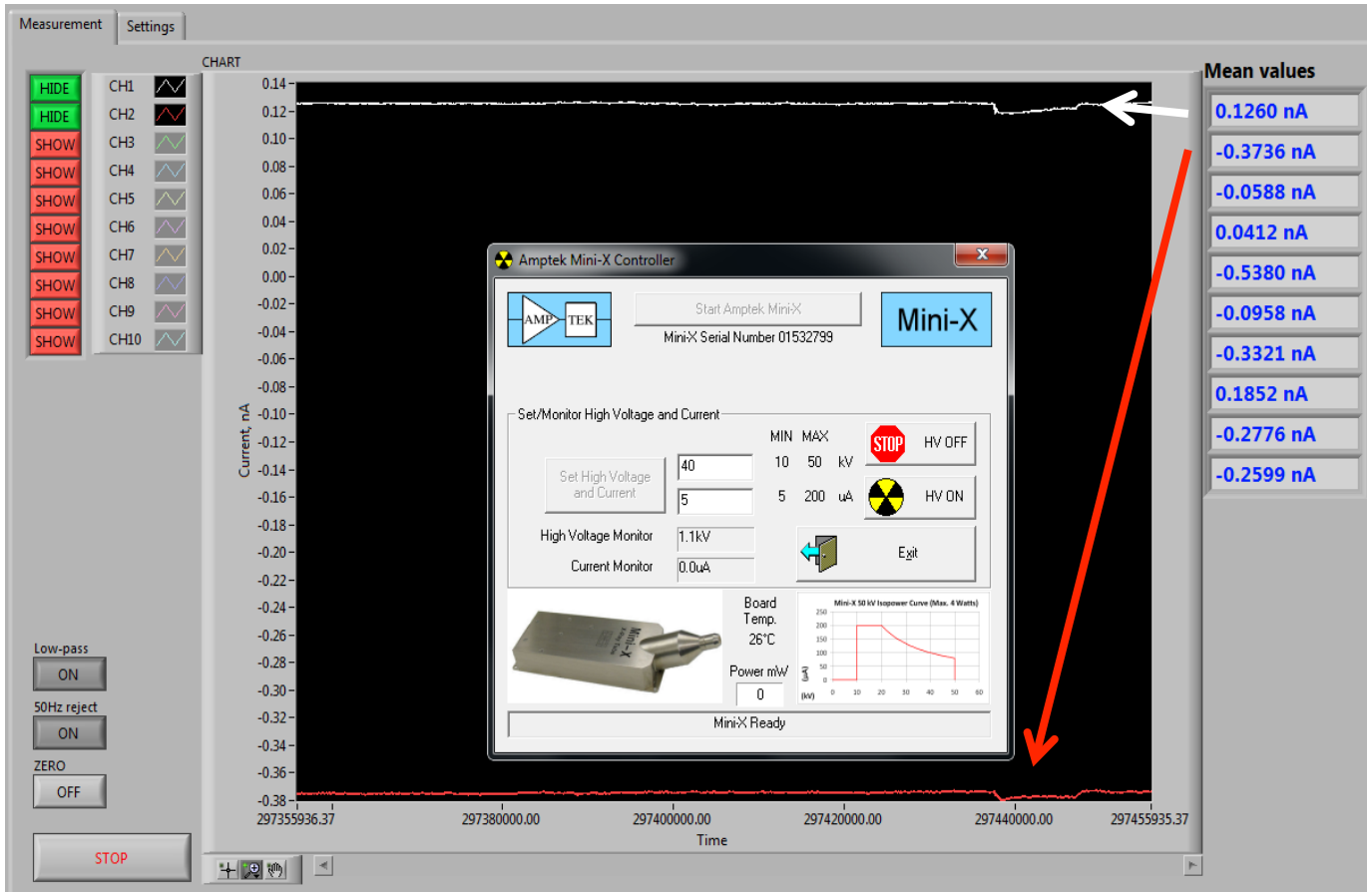
cannot lower in spite of Ne cost

ALICE configuration



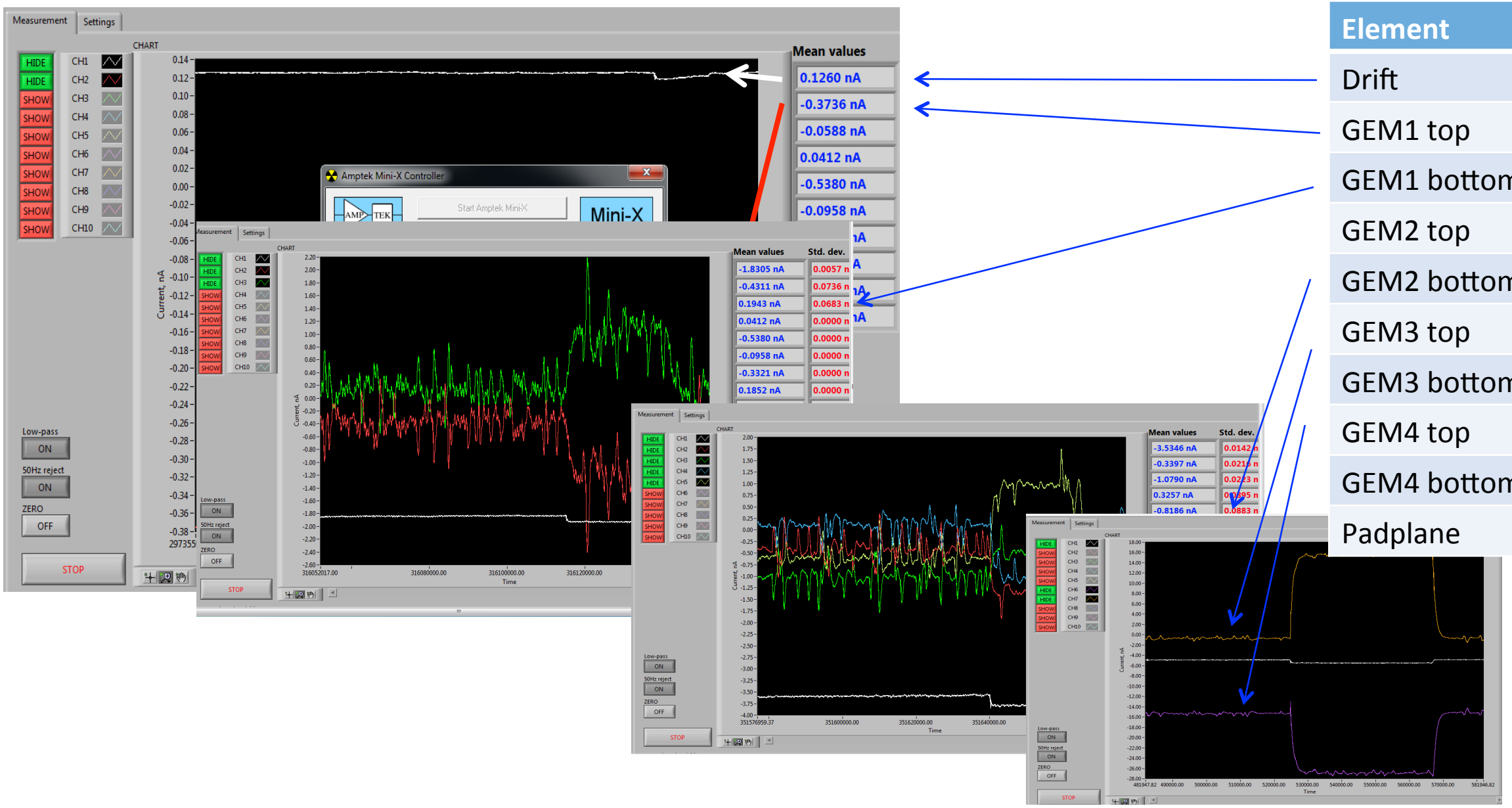
Element	Characteristics	Field, voltage
Drift	10 mm	0.4 kV/cm
GEM1	Standard (140 um)	270 V
Transfer 1	2 mm	4 kV/cm
GEM2	Long (280 um)	255 V
Transfer 2	2 mm	2 kV/cm
GEM 3	Long (280 um)	275 V
Transfer 3	2 mm	0.09 kV/cm
GEM 4	Standard (140 um)	355 V
Extraction	3 mm	4 kV/cm
Stack	Gain	1910

pA currents example



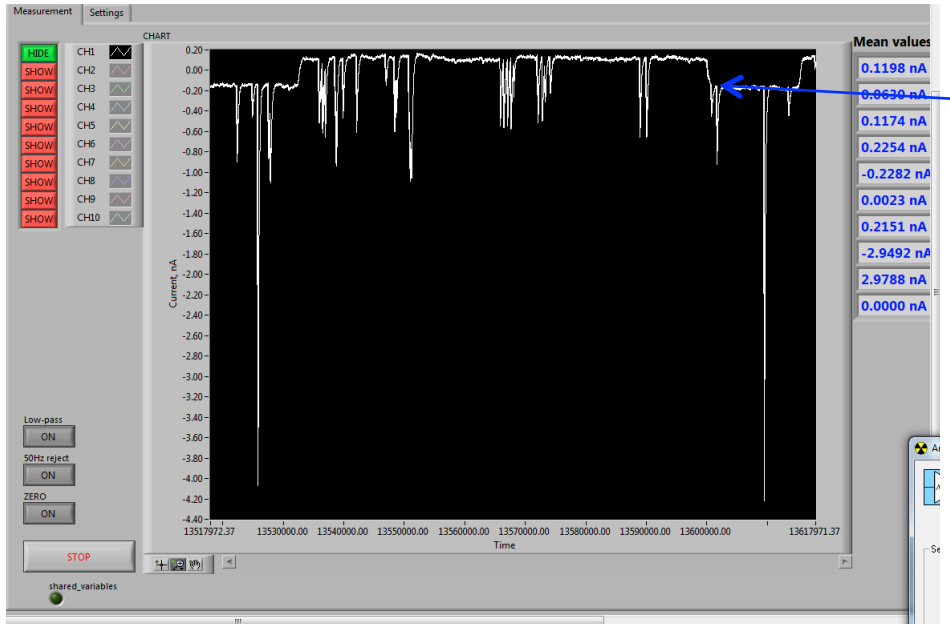
Element
Drift
GEM1 top
GEM1 bottom
GEM2 top
GEM2 bottom
GEM3 top
GEM3 bottom
GEM4 top
GEM4 bottom
Padplane

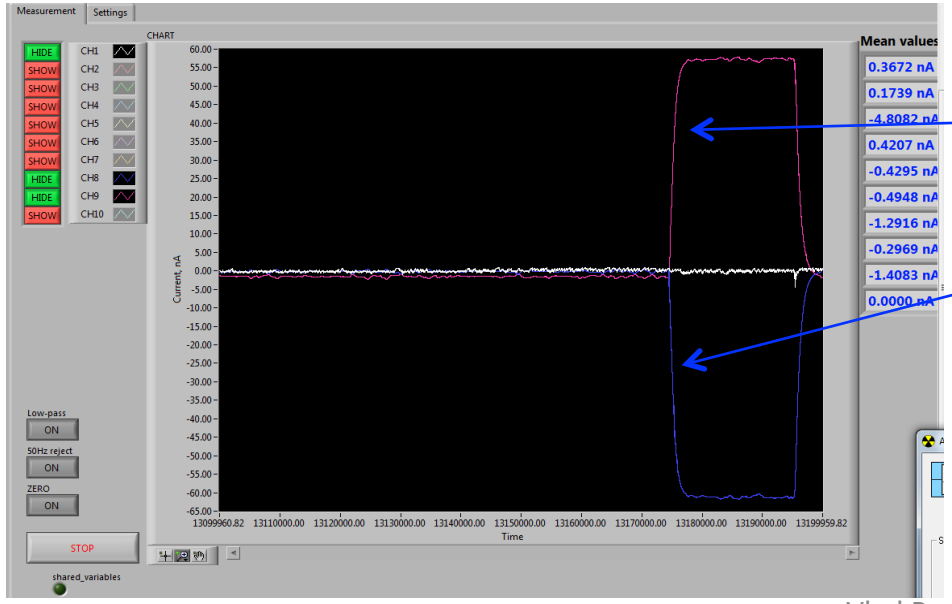
Controlling all pA currents



Element
Drift
GEM1 top
GEM1 bottom
GEM2 top
GEM2 bottom
GEM3 top
GEM3 bottom
GEM4 top
GEM4 bottom
Padplane

Measuring IBF

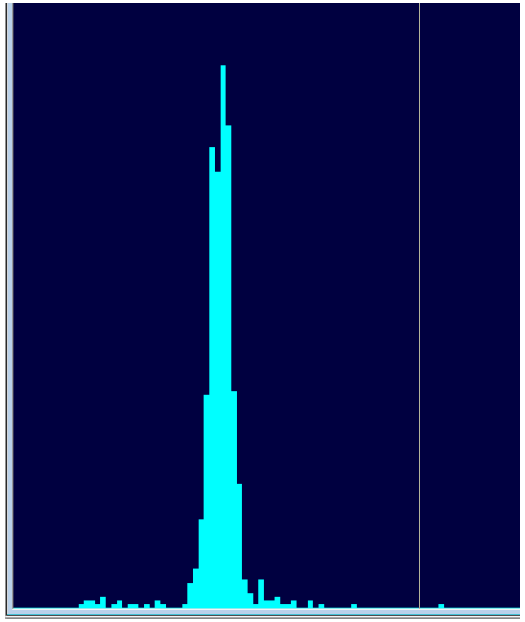




Element
Drift
GEM1 top
GEM1 bottom
GEM2 top
GEM2 bottom
GEM3 top
GEM3 bottom
GEM4 top
GEM4 bottom
Padplane

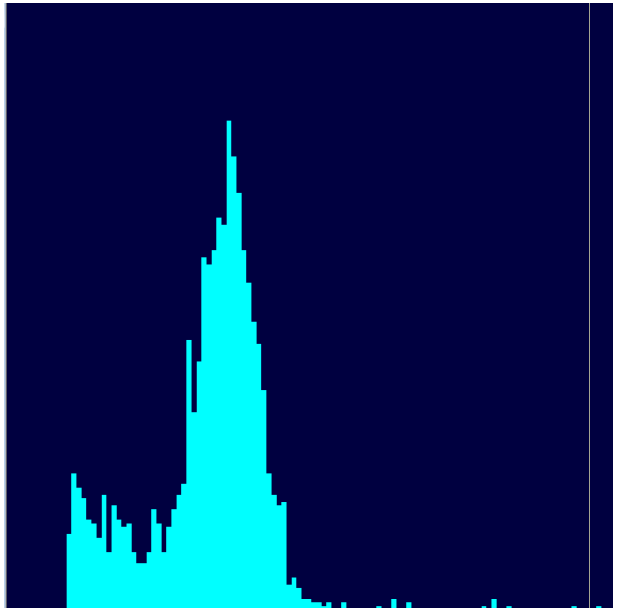
IBF=0.3/55=0.55%

Measuring gain and resolution



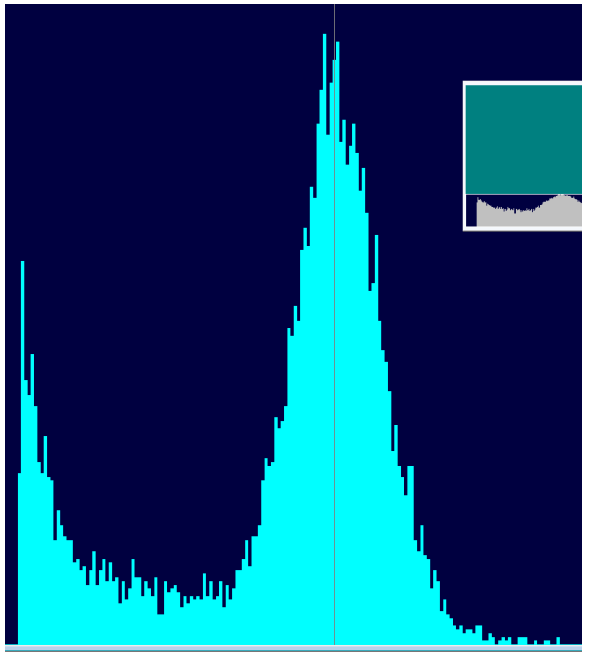
Pulse generator

^{55}Fe

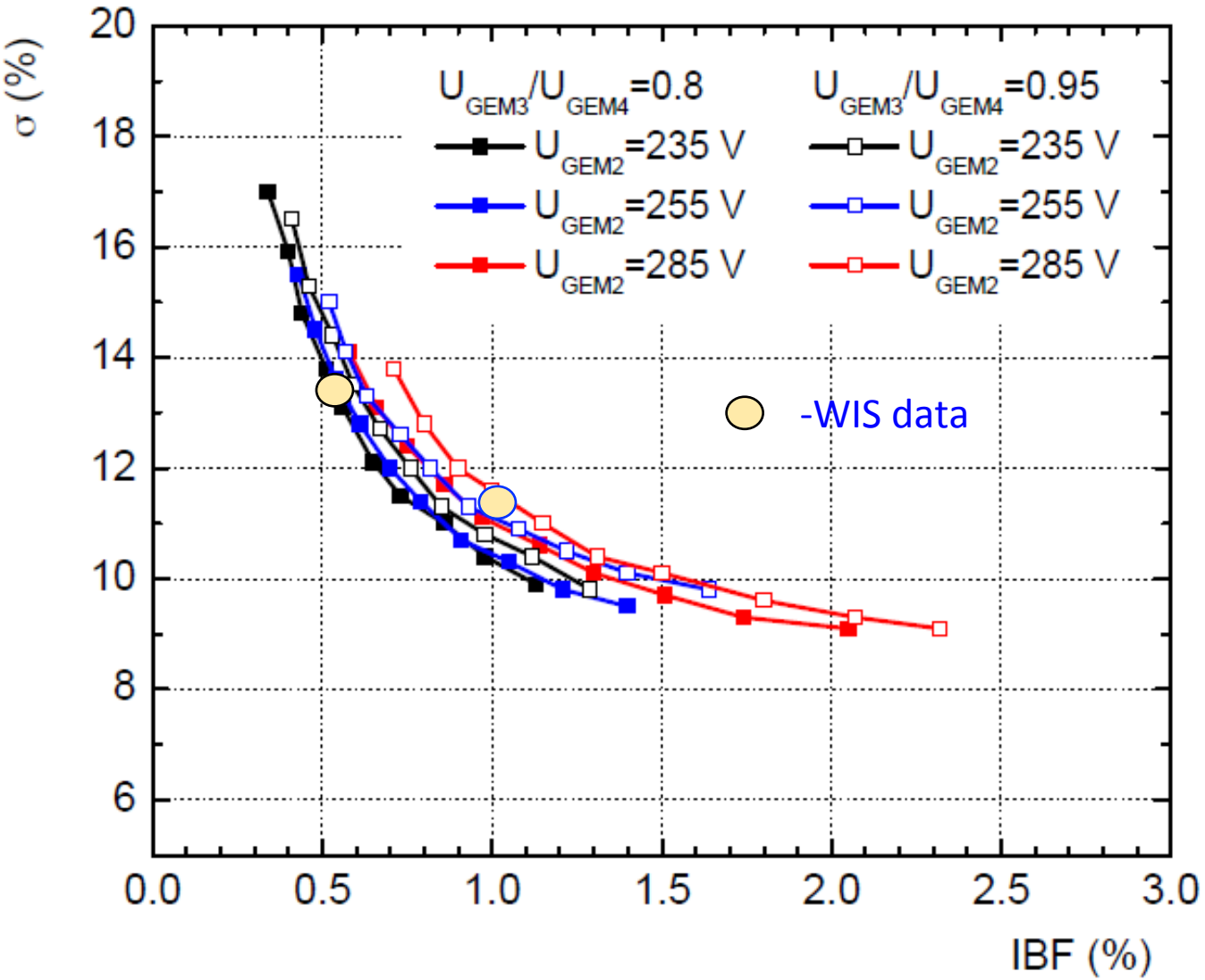


Energy resolution=13% sigma

Energy resolution=11% sigma



IBF results



Element	Setup 1	Setup 2
Drift	0.4 kV/cm	0.4 kV/cm
GEM1	275 V	270 V
Transfer 1	4 kV/cm	4 kV/cm
GEM2	255 V	255 V
Transfer 2	2 kV/cm	2 kV/cm
GEM 3	270 V	275 V
Transfer 3	0.01 kV/cm	0.09 kV/cm
GEM 4	360 V	355 V
Extraction	4 kV/cm	4 kV/cm
Gain	2150	1910
Resolution	11%	13.5%
IBF	1%	0.55%

Status and plans

- Setup with 10pA is running, plan to upgrade to 10+
- Moving pAs out of box we achieved good stability
- We succeeded to reproduce CERN data
- Next steps:
  a. We can try to measure Ne / CF_4 / iC_4H_{10}
  b. We can try adding another GEM layer
  c. We can try small pitch GEM
  d. We can try Cobra-GEM
  e. We can add mesh between GEMs
  f. Else?

- We cannot do it all before the review, let's pick one.
  a. Is fast, can switch today. It requires to increase flow and that is expensive. How critical is to have 92 / 5 / 3 ratio?
  b. other options require opening the box and finding new working point. That should cause some delay.